

What is claimed is:

1. A filter assembly for capturing debris within a blood vessel, the filter being retrievable by a retrieval sheath, comprising:

an elongate shaft having a proximal end and a distal end;

a filter disposed proximate the distal end of the elongate shaft;

the filter further comprising a first tapered portion having base diameter and an apex;

the filter comprising a second tapered portion having first diameter and a second diameter; and

wherein the base diameter of the first tapered portion is similar to an inner diameter of the retrieval sheath.

2. The filter assembly of claim 1, wherein the first diameter of the second tapered portion is similar to the inner diameter of the retrieval sheath when the filter assumes an expanded shape.

3. The filter assembly of claim 1, wherein the second diameter of the first tapered portion is substantially equal to the first diameter of the second tapered portion.

4. The filter assembly of claim 1, further including a limiter that limits the base diameter of the first taper to a diameter that is substantially similar to an inner diameter of the retrieval sheath.

5. A filter assembly for capturing debris within a blood vessel, comprising:
an elongate shaft having a proximal end and a distal end;
a filter disposed proximate the distal end of the elongate shaft; and
a means for reducing the volume of the captured debris.

6. The filter assembly of claim 5, wherein the means for reducing the volume of the captured debris comprises a lumen defined by the elongate shaft; and
a fluid source fluidly communicating with the lumen for delivering a pharmaceutical agent to a location proximate the filter.

7. The filter assembly of claim 5, wherein the elongate shaft comprises an electrically conductive core and an electrically insulating layer overlaying the electrically conductive core; and

the means for reducing the volume of the captured debris comprises a radio frequency energy source electrically coupled to the electrically conductive core of the elongate shaft and at least one aperture extending through the electrically insulating layer of the elongate shaft.

8. The filter assembly of claim 5, wherein the filter has a first portion having a first included angle and a second portion having a second included angle;

the first included angle being greater than the second included angle; and

the second portion of the filter being configured such that fine debris will be extruded through the second portion of the filter when the filter is collapsed.

9. A filter assembly for capturing debris within a blood vessel, comprising:
an elongate shaft having a proximal end and a distal end;
a filter disposed proximate the distal end of the elongate shaft; and
a lumen defined by the elongate shaft for delivering a pharmaceutical agent to an area proximate the filter.

10. The filter assembly of claim 9, further including at least one aperture defined by a wall of the elongate shaft and fluidly communicating with the lumen.

11. The filter assembly of claim 9, further including a fluid source coupled to the proximal end of the elongate shaft and fluidly communicating with the lumen.

12. The filter assembly of claim 9, wherein the filter includes an expandable frame.

13. The filter assembly of claim 9, wherein the filter includes a filter membrane.

14. The filter assembly of claim 9, wherein the frame comprises a shape memory material.

15. The filter assembly of claim 9, wherein the shape memory material comprises a shape memory alloy.

16. The filter assembly of claim 9, wherein the shape memory alloy comprises nitinol.

17. The filter assembly of claim 9, wherein the filter membrane portion of the filter tapers distally.

18. The filter assembly of claim 9, wherein the membrane includes polyurethane.

19. The filter assembly of claim 9, wherein the membrane defines a plurality of apertures.

20. A filter assembly for capturing debris within a blood vessel, comprising:
an elongate shaft having a proximal end and a distal end;
a filter disposed proximate the distal end of the elongate shaft;
the elongate shaft comprising an electrically conductive core and an electrically insulating layer overlaying the electrically conductive core; and
at least one aperture extending through the electrically insulating layer of the elongate shaft.

21. The filter assembly of claim 20, wherein the at least one aperture is disposed proximate the filter.

22. The filter assembly of claim 20, further including a lead wire electrically coupled to the elongate shaft.

23. The filter assembly of claim 20, further including a radio frequency energy source electrically coupled to the conductive core of the elongate shaft.

24. The filter assembly of claim 20, wherein the filter includes an expandable frame.

25. The filter assembly of claim 20, wherein the filter includes a filter membrane.

26. The filter assembly of claim 20, wherein the frame comprises a shape memory material.

27. The filter assembly of claim 20, wherein the shape memory material comprises a shape memory alloy.

28. The filter assembly of claim 20, wherein the shape memory alloy comprises nitinol.

29. The filter assembly of claim 20, wherein the filter membrane portion of the filter tapers distally.

30. The filter assembly of claim 20, wherein the membrane includes polyurethane.

31. The filter assembly of claim 20, wherein the membrane defines a plurality of apertures.